Geophysical Research Abstracts,
Vol. 10, EGU2008-A-10992, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-10992
EGU General Assembly 2008

Uncertainties in the estimation of the European cropland NPP

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Carbon fluxes from European croplands are the least well quantified and most uncertain of all fluxes. Whilst some studies have suggested a net loss of carbon from European croplands, predominantly as soil C, other studies have suggested that croplands are currently close to equilibrium. However, the soil carbon component being the biggest component of the carbon balance depends on carbon inputs from plant material, which is function of NPP. The cropland NPP on the continental scale is again very uncertain. The uncertainty arises from the human activities like choice of crop, fertilizer application, irrigation and others, and how these are accounted for in the various estimates of NPP. Here we use different methods to assess the NPP on country and 1km^2 level in order to understand the uncertainties arising from aggregation, land use classification and method of NPP estimation. We compare FAOSTAT estimates with MODIS NPP estimates and estimates from a simple NPP model (Miami). The MODIS and Miami NPP values are scaled using different land use classification such as MODIS IGBP land cover classification and GLC2000. The results suggest a strong influence of the method used to estimate cropland NPP. The total uncertainty is more than more than 50% when aggregated to a European total. Land use, especially, has a strong influence since the GLC2000 map has a higher estimate for the European cropland area when compared to FAO and MODIS land use. Aggregated values from MODIS and the Miami model NPP estimates at country level exhibit a strong spatial pattern in the land use influence on uncertainty. The largest differences between GLC2000 classification and MODIS are in arid and semiarid areas, as well as the

northern latitudes, leading to substantial differences